

Abstract of the Disclosure

The present invention further provides a device for the integrated micromanipulation, amplification, and analysis of polarized particles such as DNA comprises a microchip 5 which contains constrictions of insulating material for dielectrophoresis powered by an alternating current or direct current signal generator, and attached to a hot source that can be heated to specific temperatures. Nucleic acids can be heated and cooled to allow for denaturation, and the annealing of complementary primers and enzymatic reactions, as in a thermocycling reaction. After such a reaction has been completed at the constriction, 10 the dielectrophoretic field can be switched to a direct field to release the product and direct it through a matrix for fractionation. The device includes data analysis equipment for the control of these operations, and imaging equipment for the analysis of the products. The invention permits the efficient handling of minute samples in large numbers, since reactions occur while sample material is trapped between constrictions. 15 Because the positioning, reactions, and release into a fractioning matrix all occur at the constriction which serves as a focusing locus, the need to transfer samples into different tubes is eliminated, thus increasing the efficiency and decreasing the possibility of damage to the samples.

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